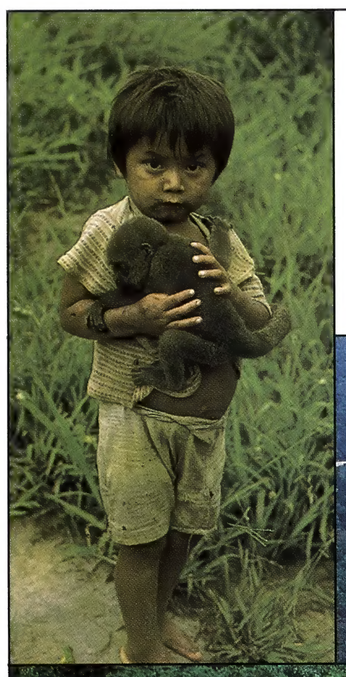
Exploration in the Tropics

Research at the Missouri Botanical Garden



Colombia. By the time this Cubeo Indian is 21 years old, the plants of the tropics will be disappearing at a rate of several species per day. Explosive human population growth, widespread poverty, malnutrition, and a lack of knowledge about how to properly utilize tropical resources are causing this problem. Tropical forests everywhere are being consumed rather than managed for human benefit.

In cooperation with scientists from the countries involved, the Missouri Botanical Garden is seeking the basic information that will help to reverse this process.

All tropical forests are likely to be destroyed or permanently changed within 50 years.

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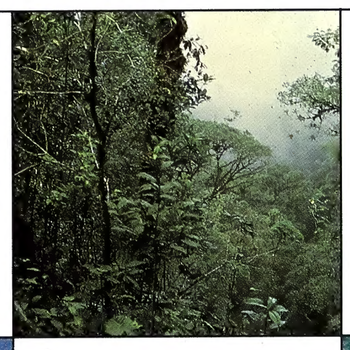

Colombia. Natural patterns reflect soil richness near the river where annual flooding enriches the soil.

Many soils in the tropics are infertile and highly acid. Tropical communities maintain nutrients in their living organisms, and few escape into the soil. For this reason, agricultural techniques developed on rich temperate soils do not work in the tropics.

[8]

Alto de Buey, Chocó, Colombia. The plants of the Chocó are perhaps the least known on earth. MBG scientists, in collaboration with their Colombian colleagues, discover many new species here, some of which may become important new foods, chemicals or energy sources—if they are found before they disappear forever. One out of four plants in this photo are found nowhere else. Many have no scientific name.

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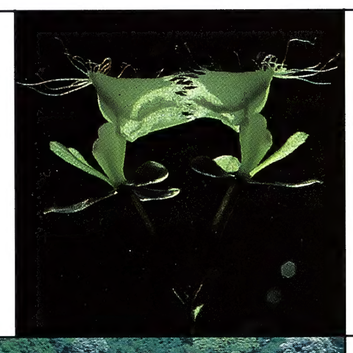


Centinela, Ecuador. ** *Epidendrum ilense*, Orchidaceae. This beautiful orchid symbolizes the race against time. Deforestation has rendered it extinct in the wild but the MBG botanist who discovered it saved it in cultivation.

About one in ten plants are members of the Orchid Family.

[2]

Corrientes, Peru. The tropical forest consists of many levels of vegetation, each with myriad different species of plants and animals. The interrelationships among these organisms are the most complex found anywhere on earth.

Scientists have discovered and named no more than one out of six of the more than three million tropical organisms.

[3]

Colombia. *Manihot esculentus* Euphorbiaceae. Cassava, or manioc, growing as a crop in recently burned forest.

Cassava, native to South America, is one of the most important food crops in Africa and Latin America. It is the source of tapioca.

[8]

Brazil. On most tropical soils, cattle can be pastured for no more than 20 years before the nutrients are depleted and the operation becomes unprofitable. At that point, the former pastures are waste land, unusable to support agriculture or natural forest.

[5]

Belize. Shifting agriculture liberates nutrients from the forest as it is burned. This technique works in low population densities. However, the number of people in the tropics is expected to double in less than 30 years. More than one third of them live in absolute poverty and are chronically malnourished.

[3]

Indonesia. Commercial lumbering is a leading cause of forest loss in tropical and subtropical Asia. The slash-and-burn agricultural practices of the rural poor, who have no other alternatives, take an even greater toll on tropical forests worldwide.

Currently, approximately 35 acres of lowland rainforest are cut every minute.

[5]

Colombia. Erosion rapidly depletes tropical soils when the forest is cut.

At least two-thirds of all plants and animals on earth live only in the tropics.

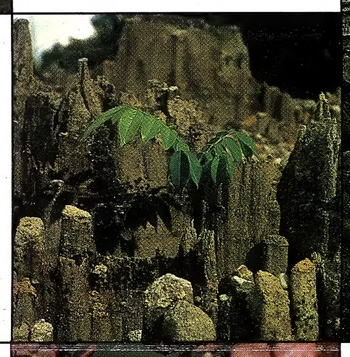
[8]

Maues River, Brazil. A village slowly eroding into the river because the forests that protect the banks are being cut as a result of mounting human pressures. Those pressures will not ease since three out of five people will be living in tropical countries by 2020.

[8]

Manaus, Brazil. Soil erosion. Lush tropical rainforests, which grow in areas of high rainfall and constant temperatures, protect the soil and conserve its scarce nutrients. [6]

Quebrada Vainilla, Loreto, Peru. This Peruvian house reflects the unique character of individual species of trees. Each part is built from a different species. [3]



Rio Atabapo, Colombia. * ** *Steyermarkochloa unifolia*, Poaceae. This grass was recently discovered by a MBG scientist. Although many new species are discovered in the tropics each year, this particular one represents a whole new tribe of the grass family—something totally unexpected.

Grasses are economically the most important family of plants. Wheat, corn and rice together provide well over half of all human food. In addition, the bamboos are indispensible as construction materials in the tropics and subtropics.

[1]

Colombia. * ** *Platycarpum schultesii*, Rubiaceae.

[8]

Brazil. * ** *Arrabidaea ornithophila*, Bignoniaceae.

[8]

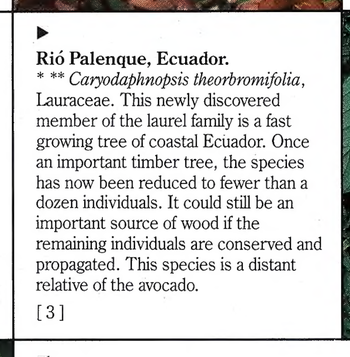
Santiago del Monte, Estado de México, Mexico. *Zea mays* "Conico". Corn (maize), originally a New World crop, is now one of the most important food plants throughout the world.

The diverse strains of corn still cultivated by rural agriculturists are being displaced everywhere by modern varieties, yet they could be important in improving this vital crop in the future.

[4]

Chocó, Colombia. * ** *Anthurium* Araceae. In less than five years, MBG staff have scientifically described 85 species in the genus *Anthurium* and 50 species in *Philodendron*. Many remain to be described. This family includes the well known Red Spathed Anthurium, the Jack in the Pulpit, and the common household Philodendron.

[3]

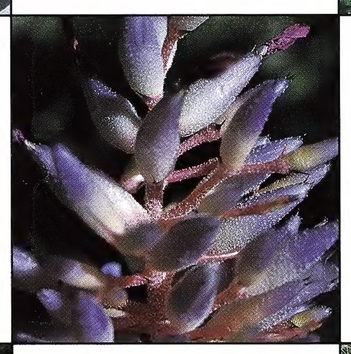


Rió Palenque, Ecuador. * ** *Caryodaphnopsis theorbromifolia*, Lauraceae. This newly discovered member of the laurel family is a fast growing tree of coastal Ecuador. Once an important timber tree, the species has now been reduced to fewer than a dozen individuals. It could still be an important source of wood if the remaining individuals are conserved and propagated. This species is a distant relative of the avocado.

[3]

Ecuador. *Discliptera dodsonii*, Acanthaceae. Only one individual of this species is known to survive. It was discovered by a MBG scientist in coastal Ecuador.

[3]



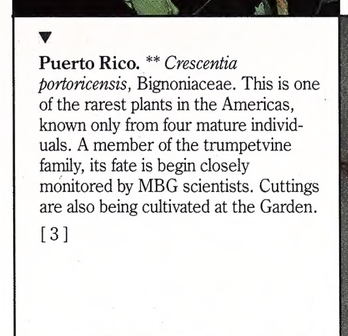
Distrito Federal, Venezuela. *Aechmea fendleri*, Bromeliaceae. All but one of the approximately 1,500 species of the pineapple family live in North and South America. The one exception is West African. That kind of geographical oddity fascinates botanists and often leads them to important biological generalities.

[7]

Amazonian Colombia. ** *Campsiandra angustifolia*, Fabaceae. The legume family has about 18,000 species and includes many important food plants such as peas, beans, soybeans, peanuts and lentils, as well as important forage plants like alfalfa and numerous fast-growing trees. Nodules formed by bacteria on the roots of legumes are responsible for most of the conversion of atmospheric nitrogen into a form that can be used by plants and animals to make proteins, nucleic acids and other essential molecules. Because of their ability to fix nitrogen, legumes can grow on many infertile soils, both protecting and improving them.

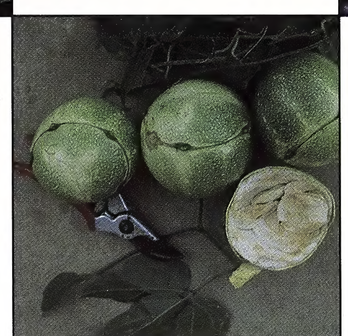
MBG has initiated a project using computers to store and process data on the legumes, to which workers on this important family worldwide will have access.

[8]



Puerto Rico. ** *Crescentia portoricensis*, Bignoniaceae. This is one of the rarest plants in the Americas, known only from four mature individuals. A member of the trumpetvine family, its fate is begin closely monitored by MBG scientists. Cuttings are also being cultivated at the Garden.

[3]



Peru. *Fevillea pedatifolia*, Cucurbitaceae. This gourd shows economic promise because of the very high oil content in its seeds. This fact was recently documented by a MBG botanist.

Indigenous people use the seeds as candles.

[3]

Centinela, Ecuador. *Gasteranthus atratus*, Gesneriaceae. This member of the horticulturally important African violet family has black leaves. This new species, first described in 1978, may now be extinct.

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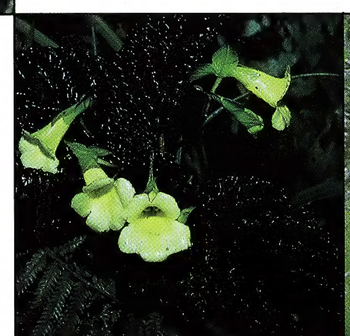

Brazil. * ** *Anemopaegma setilobum*, Bignoniaceae. This is a newly described species, discovered by a MBG scientist who is the leading specialist on this family. More than a tenth of the 900 species of this family have been described during the last ten years.

[3]

Colombia. *Jessenia bataua*, Arecaceae. This palm has seeds rich in edible oil. A palm of similar properties, the African oil palm, was brought into cultivation early in this century, and is now one of the most important crops in tropical regions worldwide.

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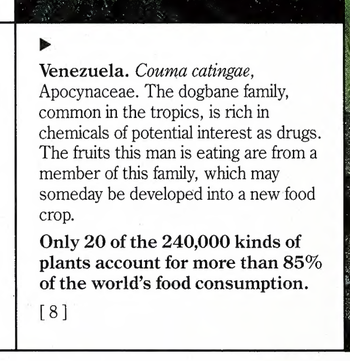

Venezuela. *Couma catingae*, Apocynaceae. The dogbane family, common in the tropics, is rich in chemicals of potential interest as drugs. The fruits this man is eating are from a member of this family, which may someday be developed into a new food crop.

Only 20 of the 240,000 kinds of plants account for more than 85% of the world's food consumption.

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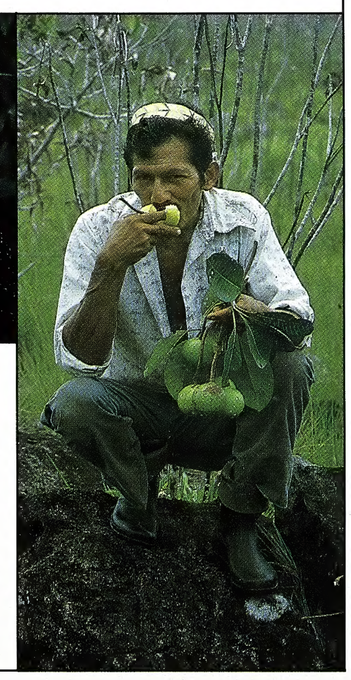

Dedication

The Board of Trustees, director and staff of the Missouri Botanical Garden dedicate this poster to Nancy Morrill Smith and Robert Brookings Smith for their support and encouragement of the Garden's efforts to explore, understand, conserve, and manage tropical plants.

Research at the Missouri Botanical Garden

Thirty Ph.D.-level scientists (ten of whom live in tropical countries), technical staff and graduate students devote their energies to the exploration and the study of tropical plants. These efforts are concentrated in northern South America, Central America and Africa.

The individual scientists are specialists in the plants of particular regions or in the classification of certain plant families, such as the economically important grass, legume, and nightshade families.

All of the research is carried out in collaboration with scientists of the countries in which they are actively working. Together they are attempting to contribute to a common knowledge of the plants that sustain us all, with a view toward conserving and properly utilizing them.

Photo Credits/Key to Symbols

[1] Gerrit Davidse, MBG
[2] Calaway Dodson, MBG
[3] Alwyn Gentry, MBG
[4] Hugh H. Iltis, University of Wisconsin
[5] James Blair, National Geographic Society
[6] Kjell B. Sandved, Smithonian Institution
[7] Julian Steyermark, MBG
[8] James Zarucchi, MBG

MBG=Missouri Botanical Garden
* identifies new species.
** identifies plant families in which MBG specializes.